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(54) IMPROVEMENTS IN OR RELATING TO ELECTRIC RAZORS

(71) I, HANS-OTTO MEYER, a German citizen of Speyerer Str. 2, D-1 Berlin 30, Germany, do hereby declare the invention for which I pray that a patent may be granted to me, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to an electric razor with at least one rotatable cutter device having rounded-off cutting edges revolving in an annular bead of a shear plate.

Such electric razors generally have a plurality of cutter devices, which are mutually spaced and rotate on a cutter head, each under an associated shear plate. For example, they often have three or four cutter devices arranged side by side in a row. Each rotatable cutter device located directly below a shear plate is usually constructed in the shape of a spider and has a plurality of cutters which extend radially outwards and which are bent towards the shear plate in the region in which they support the cutting edges. Usually the cutters are convex or rounded-off at their cutting edges, the shear plate located above the cutters having a corresponding bulge in the vicinity of the circular path of movement of the cutters, the bulge being an annular bead of convex shape.

Known shear plates for electric razors with a rotatable cutter devices are preferably provided with perforations in the form of a plurality of holes located closely side by side directly above the cutting edges of the cutters and along their circular path of movement. In use, hairs of a beard penetrate into the cutting region by protruding through the holes. The holes are arranged in rows and lines in a certain pattern, for example hexagonal. In place of a plurality of holes, it

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is also known to arrange slot-like perforations in the circular movement path of the cutters, the slot-like perforations extending at right-angles to the direction of movement. The length of the slots in the shear plate is substantially determined by the width of the cutting edges of the cutter device and the depth of the slot in the bulge is greater on the radially outer side of the bulge than on the radially inner side thereof. Thus, the hair of the beard radially outside of the annular bulge of the shear plate is more efficiently removed during the cutting operation than that which is radially inside the active cutting region of each cutter device.

Also, with known electric razors having a rotating cutter device, it is a disadvantage that the shear plate belonging to each cutter device is produced independently of an associated shear plate support. Thus a plurality of manufacturing steps increasing the cost of the razor are required. Finally, difficulties for rotating cutter devices occur in known electric razors owing to the fact that the guidance of the cutting edge of each cutter in the shear plate is insufficiently positive whereby a relatively large clearance between the cutting edge and the shear plate is unavoidable.

It is the object of the present invention to improve electric razors with a rotatable cutter device in such a manner that a simplified production of the shear plates and specific guidance of the cutter device in the latter is rendered possible, thus improving the efficiency of the razors.

According to the present invention there is provided an electric razor comprising a one-piece shear plate the outer surface of which has a convex central portion surrounded by an annular concave portion, in turn surrounded by an annular convex bulge, and a rotatable cutter device covered by the

shear plate, the cutter device having a plurality of cutters which extend into the bulge and each of which is provided with a concave cutting edge the curvature of which conforms to the cross-sectional curvature of the bulge, wherein the bulge is provided with a plurality of adjacently disposed transverse slots which extend radially of the shear plate and the ends of which are disposed on either side of the bulge at an equal spacing from the vertex thereof to give access to each cutting edge over an arc of up to 180°, and wherein each cutter is guided in the bulge by parts of the shear plate immediately adjacent the ends of the transverse slots.

The one-piece shear plate may incorporate integral means for mounting it on a support and thereby further reduce manufacturing and assembly costs. The convex construction of the central portion of the outer surface of each shear plate surrounded by the annular bulge facilitates the presentation of the hair to the transverse slots which receive the hairs not only from regions located radially outside of the annular bulge, but also from the regions located radially inside of the annular bulge. The operation of the razor constructed according to the invention is substantially improved in that both sides of each individual cutter of the cutter device are securely guided inside the annular bulge of the shear plate adjacent a cutting edge ground in a concave manner in the direction of movement so that excessive clearance and thus additional material wear as well as the danger of the jamming of hairs between the shear plate and cutter are avoided.

An embodiment of the present invention will now be described, by way of example, with reference to the accompanying drawings, in which:

Fig. 1 is a side view of an electric razor with three rotatable cutter devices;

Fig. 2 is a plan view of the razor illustrated in Fig. 1 showing the cutter head with the three cutter devices arranged in a row;

Fig. 3 is a cross-section through a cutter device and its associated one-piece shear plate; and

Fig. 4 is an enlarged illustration of part of a cutter device and associated shear plate.

As shown in Figs. 1 and 2, an electric razor consisting of a motor casing 1 and a cutter head housing 2 which has three rotatable cutter devices each covered by an associated one-piece circular shear plate 3 located on the cutter head housing 2 and aligned in a row. As seen from the side (Fig. 1), the shear plates are located at an angle with respect to each other.

That is to say they are arranged on an arc which preferably is of similar radial curvature to the average radius of curvature of all facial parts to be shaved of an average person.

One of the three cutter devices with its associated shear plate 3 is illustrated in section in Fig. 3. The shear plate 3 is manufactured in one piece without a central bore and without an insert to serve as a support, a circumferential flange 10 forming an integral means for mounting the shear plate on a support, in the present example for securing the shear plate inside the cutter head housing 2.

Starting from the flange 10, the shear plate 3 is curved towards the centre to form an annular bulge 6 which is so dimensioned that it receives with as little play as possible, the heads of individual cutters 8 of a cutter device constructed in the form of a spider. As is shown, particularly in the enlarged illustration of Fig. 4, each cutter 8 is guided on both sides and immediately adjacent its semi-circular cutting edge, by the respective adjacent internal surface parts of the shear plate 3.

Closely spaced transverse slots 7 extend over the entire vertex of the annular bulge 6 so that the cutter 8 is exposed over an arc which encompasses an angle of almost 180°. The slot depth a is chosen to be the same on both sides of the vertex of the annular bulge 6 so that independently of the direction of movement of the electric razor, the hair of the beard may be presented to the cutters to the same extent from all sides.

The presentation of the hair of a beard to the radially internal sections of the slots 7 is facilitated because, as seen in cross-section, the shear plate 3 is arched to form an annular concave region 5, immediately adjacent the annular bulge 6. In turn, a convex central portion 4 as shown in Fig. 3 adjoins the concave region 5, and the height of its vertex is almost that of the vertex of the annular bulge 6. The introduction of hair into the slots 7 is thus equally possible from radially inside and outside the annular bulge 6 and thus all the active cutting edge is utilised.

Owing to the fact that each cutter 8 of a cutter device has a large cutting angle of up to 180°, the cutting edges of the rotatable cutters must be ground in a concave manner in the direction of movement so that the lateral cutting regions still define a positive cutting angle.

WHAT I CLAIM IS:—

1. An electric razor comprising a one-piece shear plate the outer surface of which has a convex central portion surrounded by an annular concave portion in turn surrounded by an annular convex

bulge, and a rotatable cutter device covered
by the shear plate, the cutter device hav-
ing a plurality of cutters which extend
into the bulge and each of which is pro-
5 vided with a concave cutting edge the
curvature of which conforms to the cross-
sectional curvature of the bulge, wherein
the bulge is provided with a plurality of
adjacently disposed transverse slots which
10 extend radially of the shear plate and the
ends of which are disposed on either side

vertex thereof to give access to each cut-
ting edge over an arc of up to 180°, and
wherein each cutter is guided in the bulge
by parts of the shear plate immediately 15
adjacent the ends of the transverse slots.

2. An electric razor as claimed in claim
1, wherein the shear plate incorporates in-
tegral means for mounting it on a support.

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COMPLETE SPECIFICATION

2 SHEETS

*This drawing is a reproduction of
the Original on a reduced scale*

Sheet 1

Fig. 1

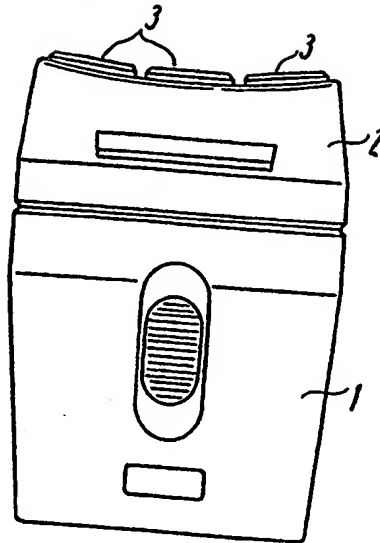
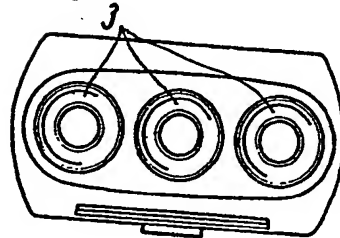
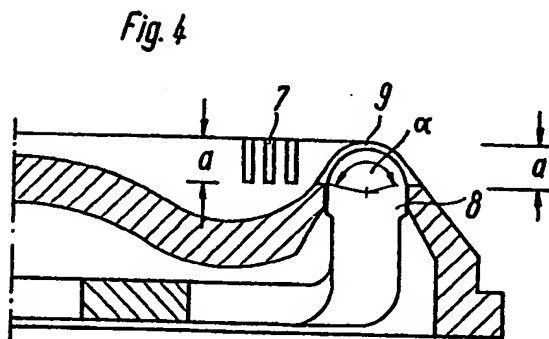
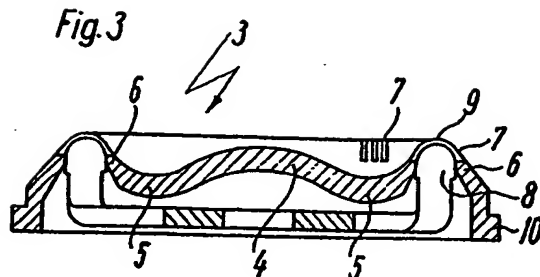


Fig. 2





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